

REMARKS

Claims 1-11, 13 and 15-31 are pending in this application. By this Amendment, claims 16, 19, 22 and 29 are amended. Reconsideration in view of the above amendments and the following remarks is respectfully requested.

Applicants sincerely acknowledge the Office Action's indication that claims 1-10 and 22-28 are allowed and claims 16-18 define patentable subject matter. However, for at least the reasons set forth below, Applicants respectfully submit all pending claims are in condition for allowance.

A. The Office Action objects to claim 19 for informalities. Applicants respectfully submit the above amendments obviate the grounds for the objection. Withdrawal of the rejection to claim 19 is respectfully requested.

B. The Office Action rejects claims 16, 29 and claims depending therefrom under 35 U.S.C. §112, second paragraph. Applicants respectfully submit the above amendments obviate the grounds for the rejection. Withdrawal of the rejection of 16, 29 and claims depending therefrom under 35 U.S.C. §112 is respectfully requested.

C. The Office Action rejects claims 11, 13, 15, 20-21 and 29-30 under 35 U.S.C. §103(a) over U.S. Patent No. 6,377,693 to Lippa et al. (hereafter "Lippa"). The rejection is respectfully traversed.

Claim 11

Applicants respectfully submit that Lippa does not teach or suggest at least features of generating a second signal that causes pseudo-spontaneous activity in an acoustic nerve, and applying the combined signal to the acoustic nerve and combinations thereof as recited in claim 11. The Office Action asserts Lippa discloses generating a second signal citing microphone 22 and ultrasonic modulator 12, which is applied to a body 18 using applicator 16a. See Item 1, lines 4-5 on page 3 of the Office Action.

1. The noise signal generator 10 in Lippa generates an auditory frequency masking stimuli applied via applicator 16b, which may be in the form of headphones or vibrational transducer. Applicants respectfully submit that applying a masking signal (e.g., variable preferred bands of white noise to the patient in the auditory range) will not provide a signal that causes pseudo-spontaneous activity in an acoustic nerve.

Applicants respectfully submit that the claims variously recite applying a signal that causes pseudo-spontaneous activity in an acoustic nerve and applying the signal to the acoustic nerve. Applicants have the right to be their own lexicographer so long as the terminology is not contrary to accepted meaning in the art, and the meaning is apparent from the specification. See §§2173.01 and 2173.05(a) of the MPEP. As described in the present specification, pseudospontaneous activity in the auditory nerve is demonstrated by statistically independent activity of a plurality of nerve fibers in the auditory nerve. See page 14, line 6-page 15, line 11 of the present specification. The preferred embodiments of the present invention are directed

to a novel electrical signal that is applied at various locations in the vicinity of the auditory nerve as described. See Figures 4A-14 of the present specification.

(a) The auditory nerve includes nerve fibers coupled or tuned to recognized “high” pitch sounds through nerve fibers tuned to recognize “low” pitch sounds. Acoustic (sound) stimulation of the auditory nerve through the ear will not generate pseudospontaneous activity in the auditory nerve because the middle and inner ear operate to change the acoustic sound to a corresponding electrical signal tonotopically applied throughout the auditory nerve based on the received acoustical stimulation. For example, a short sound can produce an extended or long corresponding electrical signal. Further, the “tonotopic” corresponding electrical signal stimulates adjacent nerve fibers based on pitch of the sound. Thus, the activity of the adjacent nerve fibers will be statistically dependent. In addition, the corresponding electrical signal will not be an electrical signal as described in the preferred embodiments according to the present invention or as recited in the claims (for example, claim 18 recites “broad band noise” or “pulse train”). For at least these reasons, sound, even a masking signal or random noise sound, will not ever generate statistically independent (i.e., pseudospontaneous) activity of the nerve fibers in the auditory nerve.

not
recited in
claim 11
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(b) Similarly, a cochlear implant transforms an acoustic signal (e.g., sound) to a corresponding electrical signal, which mimics sound by application to tonotopic electrodes of an electrode array (e.g., 22 electrodes) adjacent the auditory nerve. A corresponding electrical signal simulating sound will not generate pseudospontaneous activity in the auditory nerve

because the signal applied by an electrode will stimulate adjacent nerve fibers. Again, even a random auditory noise applied to a cochlear implant and transformed to a corresponding random electrical signal will not generate pseudospontaneous activity in the auditory nerve.

2. With respect to a signal being applied through applicator 16a, Applicants respectfully note that Lippa teaches the signal is “applied to the body vibrationally via amplifier 14a and the applicator 16a. See column 2, lines 57-60 of Lippa. Various vibrational applicators are described with respect to applicator 16 in Lippa. See column 2, lines 26-36 of Lippa.

Thus, Applicants respectfully submit that neither signals generated by the noise signal generator 10 nor signals generated by the microphone 22 would result in pseudo-spontaneous activity in an acoustic nerve and combinations thereof as recited in claim 11. Further, Applicants respectfully submit Lippa does not teach or suggest any modification to its disclosure that would result in a second signal that causes pseudo-spontaneous activity in an acoustic nerve and combinations thereof as recited in claim 11. *inc 2, lns 34-36 Lippa teaches an 'electrode'*

Claim 29

With respect to claim 29, Applicants respectfully submit that Lippa does not teach or suggest at least features of a method of modifying a neural prosthetic apparatus that receives an information signal and supplies a corresponding electrical signal to stimulate an auditory nerve, including providing a pseudospontaneous signal generator that generates a second signal, wherein the second signal is configured to induce a random pattern of activation in the auditory nerve and combinations thereof as recited.

1. The Office Action asserts Lippa discloses electrical coupling means citing applicator 16a with regard to the above features. However, as described above, Applicants respectfully submit that the applicator 16a in Lippa teaches applying signals vibrationally to the body 18. Thus, Applicants respectfully submit Lippa does not teach or suggest at least features of a method of modifying a neural prosthetic apparatus that supplies a corresponding electrical signal, wherein the second signal is configured to induce a random pattern of activation in the auditory nerve and combinations thereof as recited in claim 29.

2. Applicants respectfully note that the Office Action asserts Lippa teaches the applicator may be “an electrode which directly applies the signal to a selected portion of the body.” See page 3, lines 6-7 of Item 1 of the Office Action. Applicants respectfully submit that Lippa discloses the applicator may be an electrode which directly applies an electromagnetic signal to a selected portion of the body. See column 2, line 35 of Lippa.

3. Finally, Applicants respectfully submit that Lippa discloses a hearing aid system of the “bone conduction transmission” type. Such a general type of hearing aid is disclosed in U.S. Patent No. 4,982,434 to Lenhardt et al. (hereafter “Lenhardt”). See column 1, lines 45-51 of Lippa, which incorporates the Lenhardt patent in its entirety. Applicants respectfully submit Lippa teaches a method and apparatus for treating tinnitus by (a) masking tinnitus through the use of ultrasonic frequency signals that are generated in an ultrasonic frequency range and applied physically to a second body part of the patient (Lippa column 1, lines 37-39), and (b)

transposing human speech into the ultrasonic range applying said signals vibrationally to the body while masking stimuli in the auditory range are applied in a conventional manner.

As stated in MPEP §2141.02, a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). Specifically, Applicants respectfully submit that there is nothing in Lippa that would lead one of ordinary skill in the art to modify the disclosed “bone conduction transmission” an auditory scheme generating a second signal that causes pseudo-spontaneous activity or a second signal configured to induce a random pattern of activation in the auditory nerve and combinations thereof as variously recited and Lippa specifically and as a whole teaches away from this modification.

For at least the reasons set forth above, Applicants respectfully submit that claims 11 and 29 define patentable subject matter. Claims 13, 15, 19-21 and 30-31 depend from claims 11 and 29 respectively and therefore also recite patentable subject matter for at least that reason as well as their additionally recited features.

D. Applicants filed an Information Disclosure Statement on August 19, 2003. Applicants respectfully request consideration of the Information Disclosure Statement and a duplicate copy of the PTO-1449 form is provided for the convenience of the Examiner.

CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.

If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, **Carl R. Wesolowski**, at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
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